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February 4, 1999

BOX PATENT APPLICATION
Assistant Commissioner for Patents
Washington, D.C. 20231

> Re: Application of Takeshi KAMIMURA
> IMAGE WORKFLOW SYSTEM
> Our Ref. Q053219

Dear Sir:

Attached hereto is the application identified above including 15 sheets of the specification and claims, 4 sheets of informal drawings, and executed Declaration and Power of Attorney. The Assignment will be filed at a later date.

The Government filing fee is calculated as follows:

Total claims	13	-	20	=		x	$18.00 =	
Independent claims	3	-	3	=		x	$78.00 =	
Base Fee								$760.00

TOTAL FILING FEE $760.00

A check for the statutory filing fee of $760.00 is attached. You are also directed and authorized to charge or credit any difference or overpayment to Deposit Account No. 19-4880. The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§ 1.16 and 1.17 and any petitions for extension of time under 37 C.F.R. § 1.136 which may be required during the entire pendency of the application to Deposit Account No. 19-4880. A duplicate copy of this transmittal letter is attached.

Priority is claimed from February 5, 1998 based on Japanese Patent Application No. 24132/98. The priority document will be filed at a later date.

Respectfully submitted,
SUGHRUE, MION, ZINN,
        MACPEAK & SEAS, PLLC
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By: _____
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IMAGE WORKFLOW SYSTEM

BACKGROUND OF THE INVENTION:

Field of the Invention

This invention relates to a network system which transmits an operation document image from one terminal to another terminal and, in particular, to an image workflow system which allows an operator of each terminal to do operations to be handled to the operation document image.

Description of the Related Art

Heretofore, an image workflow system has been used to successively transfer a document in the form of a document image from one terminal to another terminal through a network. In this connection, the document may be called an operation document while the document image, an operation document image.

For example, the operation document may be a deposit function sheet used in a financial institution, such as a bank. In the financial institution, the operation document image is transferred from one section to another section in the bank and is subjected at each section to manual processing. The processed operation document image is further transferred to another section associated with this document. Finally, the processed operation document image is preserved as an evidence of a conclusion.

Herein, a wide variety of operation documents have been transferred or circulated through the workflow system in the financial institution. In this event, each operator in the sections must judge a species of the documents to execute processing

necessary to the document judged and to transfer the processed document to associated sections.

Under the circumstances, a heavy load is imposed on each operator in the conventional workflow system and becomes serious with an increase of the species of the operation document.

Alternatively, an image workflow system for reduction of the operator's load is exemplified in Japanese Laid-Open Patent Publication H 9-81488 (namely, 81488/1997). In this image workflow system, a circulation route formed through a plurality of sections or terminals is at first attached to a document as a route identifier and is scanned by an image scanner or a facsimile into an operation document image. Each terminal extracts the identifier from the operation document image to recognize the circulation route. With this system, the operation document image can automatically be circulated or transferred from one terminal to another through the circulation route.

Thus, the conventional image workflow system may circulate the operation document image. However, the operation document image can never be edited by an operator so as to add a value, a sign to the operation document image.

Also, the conventional system may not handle a document which is used in a financial institution because such a document may not always include a circulation route.

SUMMARY OF THE INVENTION:

Therefore, it is an object of the invention to provide an image workflow system in which each terminal may edit an operation document image transmitted from another terminal.

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It is another object of the invention to provide an image workflow system of the type described which may easily transmit an operation document image in which a circulation route is not always included.

It is still another object of the invention to provide an image workflow system which may observe availability of each of terminals and select one of the terminals as a destination of an operation document image based on the observation result, and which thereby an increase an efficiency of an operation associated with the selected terminal.

According to an embodiment of the invention, an image workflow system for use in transferring, through a network, an operation document image extracted from an operation document which is featured by a species, a destination, and operation to be handled to the operation document, comprises a workflow control table which stores the species, the destination, and the operation assigned to each operation document, and an image identifying server for identifying the species of the operation document from the operation document image to retrieve the species stored in the workflow control table in response to the identified species, to automatically recognize the corresponding destination and operation, and to transmit a recognized result to the network.

BRIEF DESCRIPTION OF THE DRAWINGS:

Fig. 1 shows a block diagram of an image workflow system according to an embodiment of the invention;

Fig. 2 shows an example of a document with an identification number used in the embodiment of the invention;

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Fig. 3 shows an example of a document without an identification number used in the embodiment of the invention;

Fig. 4 shows an example of a workflow control according to the invention; and

Fig. 5 shows an another example of a workflow control according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT:

Referring to Fig. 1, a workflow system according to an embodiment of the invention includes a network 10, an image input device 11, an identification table 13, a workflow control table 14, an image identifying server 12, and a plurality of operation terminals 15.

The image input device 11 may be, for example, an image pickup device, such as an image scanner, a digital camera, and scans an operation document into an operation document image.

The identification table 13 stores in advance, information (will become clear later) required for image identification. The workflow control table 14 stores destinations and identifiers of operations (for example, operation codes) each of which corresponds to an identification code representing a species of each operation document image. The image identifying server 12 identifies the species of each operation document image extracted by the image input device 11 and obtains an identification code. The workflow control table 14 is retrieved by the use of the identification code as a key under control of the image identifying server 12. The image identifying server 12 generates a packet which includes the operation document image as a data part and information, such as

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a destination and operation code, obtained by the retrieval of the workflow control 14 as a header part, and transmits the packet to a terminal of the destination.

Here, description is made about an example of a document used in a financial institution.

The operation document image obtained by the image input device 11 may be any of a binary image (white and black), a multi-valued image (gray scale), and a color image etc.

Referring to Fig. 2, a format of a savings deposit is shown as an example of the operation document. The document includes an identification code representing the species of the document in its upper right. In this case, the number "25" is printed on the operation document as the identification code.

The image workflow system of the invention may identify the number by OCR (optical character reader). That is, the system optically reads the document by the image input device 11 and recognizes the operation document image supplied by the image input device 11 using character recognition technique.

The identification table 13 stores identification codes each of which corresponds to the species of each operation document.

The character recognition is performed at the image identifying server 12 by using a standardized character pattern (recognition dictionary) and a character code representing an identification code in the identification table 13. Such the method is disclosed in Japanese Laid-Open Patent Publication H 5-128295 (namely, 128295/1993).

Referring to Fig. 3, another format of a saving deposit is illustrated which has no identification code and which is different

from that shown in Fig. 2. In this case, the system identifies a kind of document by detecting a location of a title or lines in the operation document. The location of title or lines may be stored in the identification table 13 for the identification. Such the method is disclosed in Japanese Laid-Open Patent Publication H 7-152856 (namely, 152856/1995).

Referring to Fig. 4, the workflow control table 14a includes entries of an identification code, a destination terminal number, and an operation code. Each of the destination terminal numbers corresponds to one of the identification codes. The destination terminal is representation of a reception terminal which is specified by the identification code included in the operation document image transmitted. The operation code represents the species of the operation performed at the corresponding terminal.

The image identifying server 12 judges whether the operation document image obtained by the image input device 11 is matched with information which has been stored in the identification table 13 and produces an identification code on detecting the matching. Also, since the server 12 is provided with a monitor for displaying the operation document image obtained by the image input device 11 and the resultant identification code, an operator of the system can easily confirm the resultant identification code. If the resultant identification code is obtained incorrectly or is not obtained, the operator may input the correct identification code to the system.

Next, the image identifying server 12 retrieves the workflow control table 14a using the identification code as a key and obtains the destination terminal number and the operation code which

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correspond to the identification code. Then, the server 12 generates a packet which includes the operation document image of the document obtained by the image input device 11 as a data part. Also, the destination terminal number and the operation code obtained from the workflow control table 14a as a header part. Finally, the server 12 transmits the packet to the destination via the network 10.

The operation terminal 15 destined by the packet extracts the operation code from the header part in the packet, when the terminal receives the packet. Next, the terminal 15 activates a function program on the basis of the operation code, and processes the operation document image in accordance with the function program. The process is, for example, to enter a value, sign, or edit on the operation document image.

Hereinafter, operations of the embodiment of the invention will be described in more detail into the system.

Here, it is assumed that a document shown in Fig. 2 is read by the image input device 11.

The image identifying server 12 reads an identification number in upper right in the document shown in Fig. 2 using OCR, and obtains an identification code 25. Next, the server 12 retrieves the workflow control 14a using the identification code 25 as a key, and obtains a destination terminal number 8 and an operation code P. The server 12 displays these values on its monitor. When an operator confirms them, the server 12 generates a packet which includes the above values (the identification code 25, the destination terminal number 8, and the operation code P) and the operation document image, and

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transmits the packet to the terminal of the destination terminal number 8 via the network 10.

The destination terminal number may be a network address such as an IP (Internet Protocol)-address.

The operation terminal 15 which corresponds to the destination terminal number 8 obtains the operation code from the header part in the packet, when the terminal receives the packet. Next, the terminal 15 activates a function program which corresponds to the operation code P, and processes on the operation document image of the data part in the packet according to instructions of an operator of the terminal 15.

When operation codes are different for each kind of document, in a conventional system, its operator has to determine a kind of document and transmit the operation document image of the document to a section which is responsible for the document. However, according to the invention, since the image identifying server 12 may identify a kind of document, its operator only confirm the result of the identification, and consequently, efficiency of an operation is improved.

The packet transmitted between the image identifying server 12 and the operation terminal 15 is composed of a data part (the operation document image) and a header part. However, the header and a compressed operation document image may be carried by the packet and the compressed operation document image may be decompressed by a receiving terminal. Thereby, a reduction of data amount in the packet and fast transmission of an operation document image are achieved. Further, when the compressed image is temporarily stored in a system memory, it is possible to

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reduce a memory area of the system memory occupied by the
compressed image included in the packet.

Hereinafter, operations of the invention may be carried out
by the use of arrangement different from the workflow control 14a,
as will mentioned below.

As shown in the workflow control table 14a of Fig. 4, a
destination terminal number and an operation code are determined
for each identification code.　However, a plurality of destination
terminal numbers and a plurality of operation codes may be defined
for each identification code, as shown in Fig. 5.　The workflow
control table 14b illustrated in Fig. 5 has entries of an
identification code, a first destination terminal number, a first
operation code, a second destination terminal number, and a second
operation code.

As shown in Fig. 5, an identification code 1 is associated with
a destination terminal number 1 (the first destination terminal
number) and operation A (the first operation code).　Also, the
identification code 1 is associated with a destination terminal
number 2 (the first destination terminal number) and operation B
(the first operation code).

According to the above first definitions, an operation
document image having an identification code 1 are transmitted to
terminals of destination terminal number 1 and 2 as a packet with
a header part, and different operations A and B are performed on
the operation document image at terminals of destination terminal
number 1 and 2, respectively.

Also, as shown in Fig. 5, an identification code 25 is
associated with a destination terminal number 8 (the first

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destination terminal number) and operation P (the first operation code). Also, the identification code 25 is also associated with a destination terminal number 1 (the second destination terminal number) and operation A (the second operation code).

According to the above second definitions, an operation document image having an identification code 25 are firstly transmitted to terminal of the destination terminal number 8 as a packet with a header part, and operation P is performed on the operation document image at the terminal. Next, the destination terminal number and the operation code in the header part in the packet are replaced with a next destination terminal number 1 (the second destination terminal number) and a next operation code A (the second operation code) obtained from the header part in the packet received at the terminal of destination terminal number 8. Then, an operation document image processed by the operation P and/or compressed are generated as a data part, and the data part and the header part are combined to produce a new packet. Finally, the new packet is transmitted to the terminal of the destination terminal number 1 and an operation document image of the data part in the packet are performed by the operation A. Using such a definition, operations may be performed sequentially across the terminals.

Also, as shown in Fig. 5, an identification code 30 is associated with a destination terminal number 3 or 4 (the first destination terminal number) and operation Q (the first operation code).

According to the third definition, an operation document image having an identification code 30 may be transmitted to the

terminal of the destination terminal number 3 or 4 as a packet with a header part, and the operation Q is performed at the terminal of the destination terminal number 3 or 4. This means that the packet may be transmitted to either of the terminal of the destination terminal number 3 or 4, because both terminals may perform the operation Q. In this case, the image identifying server 12 may observe the availability of both terminals (terminal numbers 3 and 4) via the network 10 prior to transmitting the packet, and may also select one of the terminals which has lowest availability as a destination. This is because such a selected terminal may be probably put into an unused state, in other words, a processing time of the operation at the selected lowest terminal is expected to be smaller than the processing time at the other terminal. Therefore, the server 12 is operable at a high efficiency.

As described above, according to the invention, the image workflow system allows each terminal to automatically execute processing necessary the operation document image transmitted from another terminal.

Also, according to the invention, the image workflow system may easily transmit an operation document image in which a circulation route is not always included.

Furthermore, according to the invention, the image workflow system may observe efficiency of each terminal and may also select one of the terminals as a destination of a packet based on the observation result, to increase an efficiency of an operation.

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WHAT IS CLAIMED IS:

1. An image workflow system for use in transferring, through a network, an operation document image (or a work sheet image) extracted from an operation document which is featured by a species, a destination, and operation to be handled to the operation document, comprising:

a workflow control table which stores the species, the destination, and the operation assigned to each operation document; and

an image identifying server for identifying the species of the operation document from the operation document image to retrieve the species stored in the workflow control table in response to the identified species, to automatically recognize the corresponding destination and operation, and to transmit a recognized result to the network.

2. The system of claim 1, further comprising an input device coupled to the image identifying server to supply the operation document as the operation document image into the image identifying server.

3. The system of claim 1, wherein the recognized result is transmitted to the network together with the operation document image in the form of a packet.

4. The system of claim 3, further comprising at least one terminal which includes a destination terminal as the destination and which is coupled to the network.

5. The system of claim 4, wherein the operation document image is processed on the basis of the operation designated by the

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recognized result, at the destination terminal which receives the
operation document image.

     6. The system of claim 1, wherein the image identifying
server identifies the species of the operation document by using
character recognition of an identification code representative of the
species when the identification code is included in the operation
document.

     7. The system of claim 1, wherein the image identifying
server identifies the species of the operation document by
recognizing an image pattern peculiar to the operation document
when an identification code which stands for the species is not
included in the operation document.

     8. The system of claim 5, wherein the destination terminal
automatically activates a program performing the corresponding
operation to the recognized result when the terminal receives the
operation document image.

     9. The system of claim 3, wherein the image identifying
server transmits the packet to a plurality of destination terminals
simultaneously when the plurality of destination terminals are
associated with the identified species in the workflow control table.

     10. The system of claim 3, wherein the packet is transmitted
from a first terminal to a second terminal after processing of the
packet at the first terminal according to the destination terminals
specified in the packet when the plurality of destination terminals
are associated with the single identified species in the workflow
control table.

     11. The system of claim 1, wherein the image identifying
server observes efficiency of a plurality of terminals and selects one

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of the terminals which have the lowest efficiency as the destination terminal when the plurality of terminals are associated with the single identification species in the workflow control table.

12. A method of managing image workflow for transferring, through a network, an operation document image extracted from an operation document which is featured by a species, a destination, and operation to be handled to the operation document, the method comprising the steps of:

storing in advance, the species, the destination, and the operation assigned to each operation document; and

identifying the species of the operation document from the operation document image to retrieve the stored species in response to the identified species, to automatically recognize the corresponding destination and operation, and to transmit a recognized result to the network.

13. A computer readable medium which stores a program operable for managing image workflow for transferring, through a network, an operation document image extracted from an operation document which is featured by a species, a destination, and operation to be handled to the operation document, the method comprising the steps of:

storing in advance, the species, the destination, and the operation assigned to each operation document; and

identifying the species of the operation document from the operation document image to retrieve the stored species in response to the identified species, to automatically recognize the corresponding destination and operation, and to transmit a recognized result to the network.

ABSTRACT OF THE DISCLOSURE:

In an image workflow system for use in transferring an operation document image to a network including a destination terminal, an image identifying server 12 identifies a species, an operation of the operation document image, and a destination by the use of an identification table and a workflow control table. The species, the operation, and the destination are transferred to the destination terminal in the form of a packet together with the operation document image through the network. Responsive to the operation document image, the destination terminal activates a program and edits the operation document image in accordance with the operation.
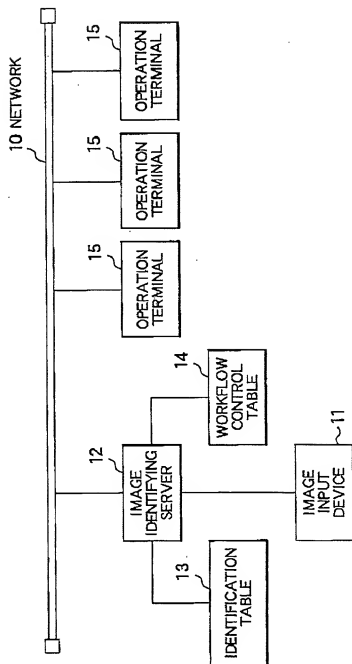
FIG. 1

SAVINGS DEPOSIT   25
NAME
ADDRESS $ ☐☐☐☐☐☐|☐☐
☐☐☐☐☐-☐☐☐☐☐
  ACCOUNT NUMBER   NEC BANK

FIG. 2

BANK OF NEC   SAVINGS DEPOSIT
☐☐☐☐☐-☐☐☐☐☐   DOLLARS   CENTS
  ACCOUNT NUMBER $ ☐☐☐☐☐☐|☐☐

FIG. 3

14a WORKFLOW CONTROL TABLE

IDENTIFICTION CODE	DESTINATION TERMINAL NUMBER	OPERATION CODE
1	1	A
2	2	B
:	:	:
25	8	P
:	:	:

FIG. 4

14b WORKFLOW CONTROL TABLE

IDENTIFICTION CODE	FIRST DESTINATION TERMINAL NUMBER	FIRST OPERATION CODE	SECOND DESTINATION TERMINAL NUMBER	SECOND OPERATION CODE
1	1	A		
1	2	B		
25	8	P	1	A
30	3 OR 4	Q		

FIG. 5

SOLE/JOINT

WN- 1950
10-24132

DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; that I verily believe I am the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural names are listed below) of the subject matter claimed and for which a patent is sought in the application entitled:

IMAGE WORKFLOW SYSTEM

which application is:

__x_ the attached application   ____ application Serial No. _____.

(for original application)   filed _____, and amended on

_____

(for declaration not accompanying application)

that I have reviewed and understand the contents of the specification of the above-identified application, including the claims, as amended by any amendment referred to above; that I acknowledge my duty to disclose information of which I am aware which is material to the patentability of this application under 37 C.F.R. 1.56, that I hereby claim foreign priority benefits under Title 35, United States Code §119, §172 or §365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified on said list any foreign application for patent or inventor's certificate on this invention having a filing date before that of the application on which priority is claimed:

Application Number	Country	Filing Date	Priority Claimed (yes or no)
24132/1998	Japan	February 5, 1998	yes

I hereby claim the benefit of Title 35, United States Code §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in a listed prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge my duty to disclose any information material to the patentability of this application under 37 C.F.R. 1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Application Serial No.	Filing Date	Status (patented, pending, abandoned)

I hereby appoint John H. Mion, Reg. No. 18,879; Donald E. Zinn, Reg. No. 19,046; Thomas J. Macpeak, Reg. No. 19,292; Robert F. Seas, Jr., Reg. No. 21,092; Darryl Mexic, Reg. No. 23,063; Robert V. Sloan, Reg. No. 22,775; Peter D. Olexy, Reg. No. 24,513-J. Frank Osha, Reg. No. 24,625; Waddell A. Biggart, Reg. No. 24,861; Robert G. McMorrow, Reg. No. 19,093; Louis Jubinsky, Reg. No. 24,835; Neil B. Siegel, Reg. No. 25,200; David J. Cushing, Reg. No. 28,703; John R. Inge. Reg. No. 26,916; Joseph J. Ruch, Jr., Reg. No. 26,577; Sheldon I. Landsman, Reg. No. 25,430; Richard C. Turner, Reg. No. 29,710; Howard L. Bernstein, Reg. No. 25,665; Alan J. Kasper, Reg. No. 25,426; Kenneth I. Burchfiel, Reg. No. 31,333; Gordon Kit, Reg. No. 30,764; Susan J. Mack, Reg. No. 30,951; Frank L. Bernstein, Reg. No. 31,484; Mark Boland, Reg. No. 32,197; William H. Mandir, Reg. No. 32,156; Scott M. Daniels, Reg. No. 32,562; Brian W. Hannon, Reg. No. 32,778 and Abraham J. Rosner, Reg. No. 33,276, my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected herewith, and request that all correspondence about the application be addressed to SUGHRUE, MION, ZINN, MACPEAK & SEAS, 2100 Pennsylvania Avenue, N.W., Washington, D.C. 20037-3202.

hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date   February 3, 1999   First Inventor TAKESHI   KAMIMURA

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